

Energy Production from Moving Vehicles

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Abstract: This research focused on vehicle-based energy generation. Energy obtained from natural sources such other renewable energy sources are examples of this. When a wind turbine is mounted to a moving vehicle, it can generate sufficient electricity. The air flow causes the turbine to spin, resulting in energy green energy." Renewable energy. The word "renewable energy" refers to the utilisation of renewable energy sources. The usage of renewable energy sources is referred to as "green energy." is energy that comes from an infinite, never-ending source. Wind, hydro, and solar are all viable options. y production. A vehicle's kinetic energy is employed to keep it going. Electricity is stored in a battery. As more people use automobiles, the consumption of fossil fuels rises, posing a financial and environmental risk. Vehicle-generated electricity, on the other hand, is both environmentally and economically beneficial and cost effective.

Keywords- Energy Conservation, Wind Power, Renewable Energy.

I.INTRODUCTION

Green power is defined as electricity provided by solar, wind, and other renewable energy sources such as geothermal, biogas, appropriate biomass, [1] and low-impact small hydroelectric sources in the voluntary market in the United States.

This renewable energy must also go above and above what is required by law to qualify as [2] green electricity. Automobiles are used to get around in today's globe. Automobiles are being used by an increasing number of people. They use a lot more fossil fuel than we do. As a result, conservation is an important notion, along with the necessity to investigate new energy sources, because it is one of the answers to this problem. Wind power is the most readily available [3] source of energy, second only to solar energy, and we use it to generate electricity here.[4]

BACKGROUND

In the nineteenth century [5] wind energy was employed to generate electricity for the first time. 93.6 gigawatts of new installations were constructed in 2021, increasing total global wind energy capacity to 837 gigawatts, up 12% from the previous year. Three times more offshore wind capacity has been installed since 2020. This wind has a 385-gigawatt

capacity, which is enough to power 400,000 houses [6] Wind and solar will account for 10% of worldwide electricity output in 2021. Furthermore, there is no stoppage of the supply. For 38% of total power supply, a clean and consistent source is available.

Table 1. Global Installed Wind Power Capacity

Country/Region	2020	New capacity 2020	2019	2018
India	38625	1096	37529	35129
United Kingdom	24167	652	23515	20743
China	290000	52300	237029	209529
United states	122328	16895	105433	96363
Spain	27446	1638	25808	23594
Germany	62784	1427	61357	59313
France	17949	1303	16646	15313
Canada	13588	175	13413	12816
Italy	10850	280	10512	9958
Brazil	18010	2558	15452	14707
Turkey	9305	1249	8056	7369
others	110'000	14'000	96'035	84'814
Total	744'000	93'000	650'785	589'547

TECHNOLOGIES

A wind power system is made up of three components: a wind turbine, a generator, and a control system [7].

b. Wind turbines are classified into two groups:

The two types of turbines are variable-speed turbines and fixed-speed turbines.[9] Turbine with variable speed Although wind turbines are the same size, different technologies are utilised for different turbines, such as constant speed induction, variable slip induction, airable fed induction, and synchronous machines using IGBT converters [8].

The following are some energy technologies:

1 Mechanically based energy storage

Information is stored via electromagnetic storage, which is a type of magnetic storage.

2 Using electromechanical techniques to store energy.[10]

This is built on sophisticated systems that employ heat, water, or air, as well as compressors. Turbines and other machinery, as well as other machinery, provide reliable alternatives to electrochemical battery storage. Compressed springs and a stretched rubber band are two examples.

GENERATOR

Wind turbines work on a simple principle: they use electricity to generate electricity rather than using power to create wind like a fan. The propeller spun around a rotor like a turbine blade, spinning a generator that produced power. The rotor generates emf in the stator coil when it rotates in the stator, resulting in the generation of electrical energy.

BATTERY

The electricity generated by the system is stored in the battery.[11]

Various types of batteries

Lead-acid Lithium-ion

A type of nickel-metal hydride is nickel-metal hydride.

Nickel-zinc(Kg/m³) is the air density.

The swept rotor area is denoted by A. (m²) The wind speed in metres per second is V.

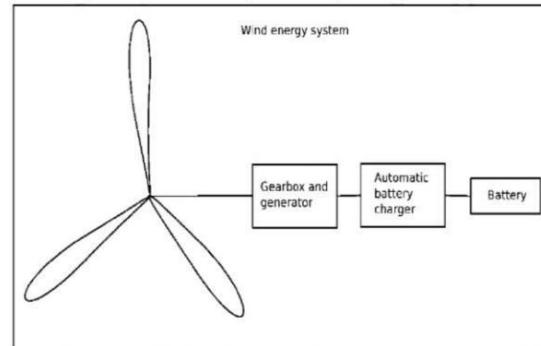
This [13] paper critiques on exceptional manage strategies used for induction motor for electric powered car applications.

CONTROL SYSTEM

A control system is a collection of mechanical or electronic components that impact the behaviour of other devices or systems through control loops.[12]

GREEN ENERGY PRODUCTION

This energy is generated in a variety of methods, and wind turbines are put in cars in a variety of ways. The wind energy system generates electricity and stores it in the battery when the vehicle is moving. Vehicles are necessary in this generation, and they are used throughout the day in large cities.



These vehicles generate a large amount of renewable energy. As a result, it helps to preserve the country's natural resources. Renewable energy delivers consistent power and fuel diversification, enhancing energy security while maintaining the country's natural resources. The habitation has a scenario in several villages and cities. The idea is to build some battery charging stations. These are used to interchange charged quantities in order to generate green energy from moving cars, and they can fulfill a big quantity of energy demand in both rural and urban areas.

CASE STUDY

A resident of sector A in Haveri commutes to Jain Institute of Technology Davangere P B Road via the NH-13 (national highway) bypass road (NH-4). The distance between the residence and the institute is 45.4 kilometres (12.2 kilometres on NH-13 and 24.2 kilometres on bypass). Wind turbines are installed in cars in a variety of ways, and this energy is generated in a variety of ways. When the car is driving, the wind energy system generates electricity and stores it in the battery. Vehicles are essential in this generation, and they are used all day in major cities. These vehicles generate a large amount of renewable energy is required. On NH-4, there's an ass road that's 9.0 kilometres long.

The travel times for these distances are 18, 17, and 10 minutes, respectively. Between these distances, the car's average speed would be 11.30m/sec, 23.72m/sec, and 15.0m/sec. The air density is 1.225 kg/m³, and the wind turbine's area is 0.0707 m² (30cm diameter).

Energy = $16/271/2 \cdot 1.2250.0707$ is the amount of energy created by a wind energy system (11.30) 3 18/60 Wh+16/27 1/21.2250.0707

$$\begin{array}{ccc}
 \text{Wh+16/27} & 1/21.2250.0707 & \text{Wh+16/27} \\
 1/21.2250.0707 & \text{Wh+16/27} & 1/21.2250.070 \\
 (23.72) & 3 & 17/60 \quad \text{Wh+16/271/21.2250.0707} \\
 \text{Wh+16/271/2} & \text{Wh+16/271/2} & \text{Wh+16/271/2}
 \end{array}$$

Wh+16/271/2 Wh+16/ (15.0). Energy=122.5764wh possibly provide some energy. As a result, the total energy generated by wind energy in conjunction with automobiles is 245.15Wh.

ADVANTAGES

This return journey might be totally fueled by the electricity generated by these cars, which would be both environmentally friendly and cost-effective.

- It's both long-term and non-harmful.
- The use of fossil fuels is being reduced.
- Green energy produces no carbon dioxide or greenhouse gases, and it is environmentally benign.
- These renewable energy sources are affordable.

DISADVANTAGES

Wind energy and other natural resources are not always available, and the initial installation cost is high.

CONCLUSION

In this paper we analyze the consequences of fossil fuels on the environment and climate change are examined in this paper. The use of fossil fuels is more detrimental to the environment. Energy generation is critical in modern civilizations; it is a necessary input for all sectors and industries, and it is also necessary to generate electricity. We are generating green energy from a fast-moving vehicle, which is extremely environmentally friendly. Wind power is used to generate electricity. Energy generating that produces

greenhouse gases, emits fossil fuels, and in some way reduces air pollution.

REFERENCES

- [1] Website of the Emission Database for Global Atmospheric Research (March 14, 2016). [Online].
- [2] “A method for generating electricity by capturing tunnel induced winds” by REKHI,
- [3] Girirajan, B., Shekhar, H., Lai, W.C., Jagannathan, H.K. and Bidare Divakarachar, P., 2022. High Gain Converter with Improved Radial Basis Function Network for Fuel Cell Integrated Electric Vehicles. *World Electric Vehicle Journal*, 13(2), p.31.
- [4] C.J. Baker (1986), “Train Aerodynamic Forces and Moments from Moving Model Experiments”, Journal of Wind Engineering and Industrial Aerodynamics, 24(1986), 227-2514. Cuddy, M. R. & Wipke, K. B. Analysis of Fuel Economy Benefit of Drivetrain Hybridization.
- [5] (2016, March 14) Emission Database for Global Atmospheric Research Website.
- [6] (2016, April 05) Ministry of Power, Government of India Website.[Online].
- [7] C. Wang, L. Wang, L. Shi, and Y. Ni, A Survey on Wind Power Technologies in Power Systems. IEEE Power Engineering Society General Meeting, June 2007.
- [8] I. Erlich, F. Shewarega, C. Feltes, F. W. Koch, and J. Fortmann, Offshore Wind Power Generation Technologies. Proceedings of the IEEE, April 2013.
- [9] T. Boutsika and S. Santoso, Quantifying the Effect of Wind Turbine Size and Technology on Wind Power Variability. IEEE Power and Energy Society General Meeting (PES), July 2013.
- [10] M. Arifujaman, M. T. Iqbal, J. E. Ouaiocoe, and M. J. Khan, Modeling and Control of a Small Wind Turbine. Canadian Conference on Electrical and Computer Engineering, May 2005.

- [11] Xuesong Zhou, Yitong Lin, and Youjie Ma, The Overview of Energy Storage Technology. IEEE International Conference on Mechatronics and Automation (ICMA), August 2015.
- [12] F. Ben Ammar, I. H. Hafsa, and F. Hammami, Analytic Hierarchy Process Selection for Batteries Storage Technologies. International Conference on Electrical Engineering and Software Applications (ICEESA), March 2013.
- [13] A. Saez-de-Ibarra, A. Milo, H. Gatzanaga, I. Etxeberria-Otadui, P. Rodriguez, S. Bacha, and V. Debusschere, Analysis and Comparison of Battery Energy Storage Technologies for Grid Applications. IEEE Grenoble PowerTech, June 2013
- [14] Nandish B M, Bhagyashree Hosamani, 2014, A Review of Energy Harvesting From Vibration using Piezoelectric Material, International Journal Of Engineering Research & Technology (Ijert) Volume 03, Issue 07 (July 2014).
- [15] Marulasiddappa, H. B., & Pushparajesh, V. (2021, February). Review on different control techniques for induction motor drive in electric vehicle. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1055, No. 1, p. 012142). IOP Publishing.